

Louisiana.—New Orleans, 17th.
Maryland.—Emmitsburg, 8th; Fort McHenry, 14th; Ocean City, 13th, 26th.
Massachusetts.—Westborough and Heath, 8th; Rowe, 8th, 11th; Provincetown, 20th.
Michigan.—Kalamazoo and Northport, 31st.
Minnesota.—Duluth, 22d; Hastings, 30th.
Missouri.—Jefferson Barracks, 7th; Curryville, 24th.
Nebraska.—Crete and Marquette, 21st.
Nevada.—Fort McDermitt, 21st.
New Jersey.—Newark, 8th, 9th, 26th.
New Mexico.—Fort Union, 15th, 23d, 31st.
New York.—Factoryville, 7th; Humphrey, 8th; Oswego and Syracuse, 11th.
North Carolina.—Weldon, 9th; Highlands, 11th; Chapel Hill, Ogreeta, Statesville, Scott's Hill, and Wilmington, 25th; Hatteras and Wash Woods, 29th.
Ohio.—College Hill, 5th, 25th; Jacksonburg, 18th, 25th; Cincinnati, 25th.
Oregon.—Portland, 10th; Astoria, 10th, 19th; Roseburg, 26th.
Pennsylvania.—Dyberry, 9th.
Tennessee.—Ashwood, 19th, 25th; Austin, 25th.
Texas.—Indianola, 12th; Galveston, 13th.
Utah.—Salt Lake City, 5th, 6th; Nephi, 7th, 10th.
Virginia.—Norfolk, 13th; Wytheville, 19th; Variety Mills, 25th; Chincoteague, 26th.
Wisconsin.—Evansville and Sussex, 30th; Manitowoc 31st.
Washington Territory.—Dayton, 12th.

WINDS.

The most frequent directions of the wind during March, 1884, are shown on chart iii. by arrows flying with the wind. In the Missouri valley, New England, and the middle Atlantic states, they were from north to west; in the south Atlantic and Gulf states, from southeast to southwest; in the lake region and upper Mississippi valley, variable; on the Pacific coast, from west to northwest.

TOTAL MOVEMENTS OF THE AIR.

[In miles.]

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England.....	Block Island, R. I.....	11,733	New London, Conn.....	6 139
Middle Atlantic states.....	Delaware Breakwater.....	12,976	Lynchburg, Va.....	3,446
South Atlantic states.....	Fort Macon, N. C.....	11,625	Augusta, Ga.....	3,341
Florida peninsula.....	Key West.....	7,919	Sanford.....	5,451
Eastern Gulf states.....	Pensacola, Fla.....	6,552	Montgomery, Ala.....	5,061
Western Gulf states.....	Indianola, Tex.....	10,737	Little Rock, Ark.....	4,753
Rio Grande valley.....	Brownsville, Tex.....	8,165	Rio Grande City.....	5,838
Tennessee.....	Chattanooga.....	5,766	Memphis.....	4,550
Ohio valley.....	Louisville, Ky.....	6,619	Cincinnati, Ohio.....	4,682
Lower lake region.....	Sandusky, Ohio.....	9,693	Toledo, Ohio.....	5,620
Upper lake region.....	Milwaukee, Wis.....	9,260	Duluth, Minn.....	5,179
Extreme northwest.....	Fort Buford, Dak.....	6,282	Saint Vincent, Minn.....	4,659
Upper Mississippi valley.....	Saint Louis, Mo.....	9,961	Dubuque, Iowa.....	4,132
Missouri valley.....	Leavenworth, Kans.....	6,822	Omaha, Nebr.....	5,819
Northern slope.....	Cheyenne, Wyo.....	9,974	Helena, Mont.....	3,625
Middle slope.....	Dodge City, Kan.....	12,316	Denver, Colo.....	5,732
Southern slope.....	Fort Concho, Tex.....	8,658	Fort Davis, Tex.....	7,064
Southern plateau.....	Fort Apache, Ariz.....	5,335	El Paso, Tex.....	3,981
North Pacific coast region.....	Fort Canby, Wash. T.....	5,710	Olympia, Wash. T.....	1,559
Middle Pacific coast region.....	San Francisco, Cal.....	6,998	Red Bluff, Cal.....	4,974
South Pacific coast region.....	Los Angeles, Cal.....	5,681	Yuma, Ariz.....	4,394

On the summit of Mount Washington, New Hampshire, and Pike's Peak, Colorado, the total movements of the air were 24,525 and 19,128 miles, respectively, the record of the first-named station being incomplete on account of frost work. At Salt Lake City, Utah, the total movement of the air was 4,662 miles.

HIGH WINDS.

On the summit of Pike's Peak, Colorado, the highest wind velocities were: 72 w., 4th and 9th, and 112 sw., 26th; other dates on which velocities of fifty or more miles per hour were

recorded are as follows: 3d, 5th, 7th, 10th, 11th, 12th, 15th, 21st, 23d, 25th, 26th, 27th, 31st.

At Cape Mendocino, California, the following high velocities were recorded: 72 se., 8th; 92 ne., 9th; 56 se., 13th; 54 se., 14th; 72 se., 27th; the record covered only portions of the month, viz.: from 7th to 17th, 20th, 21st, 22d, and from 27th to 31st.

On the summit of Mount Washington, New Hampshire, the highest wind velocities were 100 nw., 4th; 114 n., 10th; 90 sw., 11th; 122 sw., 12th; 80 nw., 13th; 80 w., 14th; 80 nw., 22d; 85 s., 23d; 82 se., 26th; 88 nw., 30th. Other dates on which velocities of fifty or more miles per hour were recorded are as follows: 3d, 5th, 6th, 7th, 15th, 16th, 17th, 18th, 25th, 29th, 31st.

Other stations reporting velocities of 50 or more miles per hour, are as follows:

Cape May, New Jersey, 60, w., 3d; 52, nw., 10th; 72, nw., 30th; 60, nw., 31st.
 Fort Elliott, Texas, 60, s., 10th; 68, sw., 27th.
 Sandy Hook, New Jersey, 61, nw., 30th; 52, nw., 31st.
 Buffalo, New York, 60, sw., 12th.
 Cheyenne, Wyoming, 57, nw., 27th.
 Dodge City, Kansas, 56, sw., 10th.
 Delaware Breakwater, Delaware, 56, nw., 30th.
 Erie, Pennsylvania, 55, s., 11th.
 Denver, Colorado, 54, w., 27th.
 Cape Henry, Virginia, 52, nw., 31st.
 Fort Maginnis, Montana, 52, nw., 10th.
 Port Huron, Michigan, 50, w., 12th.

LOCAL STORMS.

Below are given brief descriptions of the local storms reported from the several states during March, 1884. The most severe storms of this character were those occurring in the Ohio valley and Southern states on the 25th, during the passage of low area xi.:

Alabama.—Guntersville, Marshall county: during the night of the 12-13th, a violent storm occurred four or five miles southeast of this place. The course of the storm was slightly north of east, and its path was about one-half mile wide. About thirty buildings were blown down and two persons killed and several injured.

Clayton, Barbour county: a severe storm passed through the northern outskirts of this town on the 25th. Its course was from southwest to northeast, and the path about one-fourth mile in width. Many cabins and out-buildings were destroyed and other damage done.

Colorado.—Denver: about fifty buildings in this city were unroofed by the storm of the 27th, entailing losses aggregating about \$15,000. The storm began at 9.30 p. m. and continued until after midnight, the wind reaching a velocity of fifty-four miles per hour from the west.

Connecticut.—New Haven: a severe gale occurred on the 30th, causing considerable damage to shipping.

New London: a dangerous off-shore gale prevailed on the 30th. Numerous vessels arrived in disabled condition.

Delaware.—Delaware Breakwater: during a gale on the 14th a wind velocity of forty-seven miles was recorded. On the 30th the wind reached a velocity of fifty-six miles from northwest. During this storm the schooner "Riverdale" capsized and drifted seaward; and the schooners "Mattie Holmes," "Annie M. Reynolds," and "Charles H. Hodgdon" went ashore. The sloop "Potosi" was entirely dismasted.

Georgia.—Macon, Bibb county: a violent storm passed over the northeastern part of this state on the 25th, destroying many buildings and causing loss of life.

Gainesville, Hall county: at about 2 p. m. of the 25th, a destructive storm passed over this place coming from the southwest, wrecking numerous buildings and levelling trees, etc., in its course. The tornado cloud was cone-shaped and entered Hall county near the confluence of the Chertatee and Chattahoochee rivers.

Whitesburg, Carroll county: between 4 and 5 p. m. of the 25th, a tornado passed through the northern suburbs of this town, destroying everything in its path, which was about two hundred and fifty yards in width. The funnel-shaped cloud was seen when from eight to ten miles west, about fifteen minutes before reaching this place. The cloud varied in form during its passage and at times disappeared from view. When distant about three or four miles the whirling motion of the cloud was distinctly observed, and a loud roaring sound was heard. After the passage of the tornado cloud, it was observed that in the centre of the path marked by fallen timbers there was a narrow belt swept clean of leaves and debris. Two persons were killed near Lowell, in this county.

La Grange, Troup county: a few minutes before 6 p. m., on the 25th, much attention was attracted by the peculiar and rapid movement of the clouds in the southwest. The clouds were seen flying from every direction toward a given centre, which was a black, boiling mass. As it approached a loud roaring noise was heard. From this place the entire cloud was favorably viewed, as it moved at a velocity not exceeding twelve miles per hour. No damage was done at this place. Three miles west of town some out-houses were blown down and a dwelling was slightly damaged.

Lumpkin, Stewart county: a tornado occurred about one mile west of this place on the evening of the 25th, passing in a northeasterly direction and causing great destruction in its path.

Woodstock, Cherokee county: a tornado occurred near this place about 1 p. m. of the 25th, the track being about one hundred and fifty yards in width. It passed in a northeasterly direction, blowing down or unroofing all buildings in its path. The tornado cloud was funnel-shaped, and during its passage produced a terrific noise.

Illinois.—Harrisburg, Saline county: on the afternoon of the 11th, a tornado passed over this county in a direction from southwest to northeast. Six farm-houses were entirely destroyed and several were unroofed or otherwise damaged. Reports from Whiteside, eighteen miles southwest from Starkville, state that the tornado was very destructive in that vicinity.

Indiana.—Indianapolis: between 3 and 4 p. m., of the 25th a severe storm accompanied by hail passed over this city, unroofing houses and blowing down trees. At Brightwood, four miles east, a dwelling was blown down and several persons were injured.

Seymour, Jackson county: a destructive storm passed over this place on the afternoon of the 25th. Several houses were unroofed and many trees blown down. The storm passed in a northeasterly direction.

Richmond, Wayne county: about 5 p. m. of the 25th, a severe storm passed over this place from the southwest, unroofing several dwellings. At Madison, Jefferson county, the storm caused considerable damage to buildings, and also at Greenfield, Hancock county. It passed within one mile of Connersville, Fayette county, causing much damage to forests in that vicinity.

Dayton, Tippecanoe county: a destructive storm occurred at 6 p. m. of the 25th. The greatest damage was done at points south and east of this city.

Bedford, Lawrence county: a severe storm of wind and hail occurred on the afternoon of the 25th, causing considerable damage.

Brookville, Franklin county: a destructive storm passed through the eastern part of this county between 4 and 5 p. m. of the 25th. Its course was from southwest to northeast, and many buildings and trees in its path were blown down. The village of Scipio, twelve miles east, was almost entirely destroyed.

Indian Territory.—Fort Reno: a very heavy storm occurred on the 31st; one building was blown down, and other damage caused by the high wind.

Kansas.—Wellington, Sumner county: a heavy gale occurred

on the afternoon of the 27th, upsetting small buildings and blowing down awnings, etc.

Kentucky.—Lexington, Fayette county: reports from Colemansville, Harrison county, state that that place was almost entirely destroyed by a tornado on the afternoon of the 25th. The storm passed through the forest south of Falmouth, Pendleton county, where its path was about one-half mile in width.

London, Laurel county: a very severe storm occurred in this vicinity at about 4 p. m. of the 25th, destroying numerous buildings and causing loss of life. The damage to property in this county is estimated at \$17,000.

Boyd, Harrison county: a very destructive storm passed over this place at about 4 p. m. of the 25th. Many buildings were destroyed and several persons injured.

Louisiana.—Liberty Hill, Bienville parish: at 4 p. m. of the 11th a violent storm occurred five miles northwest of this place. Its path was about two hundred yards in width and about one mile in length.

New Orleans: a southerly gale occurred during the evening of the 17th, during which the wind reached a velocity of thirty-six miles per hour. Telegraph poles, signs, etc., were blown down, and the steamers "Whisper" and "J. W. Cannon" broke from their moorings, the latter sustaining damage to the extent of \$1,000.

Massachusetts.—Provincetown: a severe northwesterly gale prevailed on the 30th. Several vessels were detained in the harbor during the storm. The schooner "W. H. Mailer," went ashore on Peaked Hill Bar.

Mississippi.—Starkville: at 3 p. m., of the 11th, a destructive tornado passed within one mile of Starkville, in a direction from southwest to northeast. Buildings were completely demolished and the largest trees were torn up by the roots. The Agricultural and Mechanical college was damaged to the extent of \$10,000. Two persons in this vicinity were killed. The tornado was very destructive at Whitefield, eighteen miles southwest of Starkville. Barns, fencing, etc., on plantations in that locality were destroyed and much stock killed.

Missouri.—Kansas City: buildings were unroofed and otherwise damaged by high wind on the evening of the 27th.

Chillicothe, Livingston county: between 7 and 8 p. m., of the 27th, a funnel-shaped cloud of inky blackness approached this city. It was accompanied by a loud and roaring noise of very short duration. No damage resulted other than the blowing down of a few light out-buildings.

New Jersey.—Cape May: a northwesterly gale occurred on the 30th, during which the wind reached a velocity of seventy-two miles per hour, and for five minutes it blew at the rate of eighty-four miles.

New York.—Buffalo: a severe gale occurred on the 12th. At 6.30 p. m. a maximum velocity sixty miles from the west was recorded. A large amount of damage resulted from the storm.

New York City: a strong gale occurred on the 30th; maximum wind velocity, thirty-six miles, from the west. Telegraph lines and fencing were blown down, and numerous minor disasters were caused to shipping interests.

North Carolina.—Ogreeta, Cherokee county: a tornado occurred about ten miles northwest of this station at 8 p. m. of the 8th, tearing down trees, etc., for a distance of seventy or eighty yards, and then ceasing abruptly, the storm-cloud having apparently lifted from the earth.

Statesville, Iredell county: a destructive tornado occurred in this vicinity at 5.30 p. m. of the 25th. It apparently originated a few miles west of Newton, Catawba county, and passed directly eastward until reaching south of Statesville, where its course changed to the northeast and continued in that direction until reaching a point one and one-half miles north of the Western railroad track. Beyond this point no further evidences of the tornado were apparent. On the same afternoon another tornado started at a point west of Elmwood (a few miles south of the track of the tornado above

mentioned), and passed eastward, its path being about three-fourths mile in width. This tornado was accompanied by hail of very large size, some of the hailstones measuring six inches in circumference.

Wilmington: a very heavy rain and thunder storm, accompanied by hail, occurred between 11.15 and 11.50 p. m. of the 25th. Hailstones measuring one inch in diameter were picked up after the storm. From two to three miles south of the city windows were broken, gardens ruined, and small animals killed by the hailstones.

Charlotte: a severe storm passed over this city between 9 and 10 p. m. of the 25th. It passed in an easterly direction and was accompanied by a remarkable electrical display. Very little damage was done in this city, but at points a few miles southwestward, dwellings and trees were blown down. Reports from Newton, Catawba county, state that about thirty houses were blown down during the storm on the night of the 25-26th, and that many persons were injured. The storm is also reported to have been very severe in Iredell county, where great damage was done to buildings and forests. But little damage was done at Charlotte.

Ohio.—Dayton, Montgomery county: the storm of the 25th, was very destructive in this vicinity. It passed in a north-easterly direction, leveling trees and buildings in its course. The path of the storm (about fifty yards in width), was not continuous, the forests showing that in places the storm lifted from the earth. Five buildings were wrecked in this city. At Shakertown, seven miles distant, several houses were blown down, and thirty houses were reported to have been destroyed at Ridgeville.

Ripley, Brown county: many buildings were unroofed by the storm on the evening of the 25th.

Youngstown, Mahoning county: several residences in Poland township, in this county, were demolished by the storm of the 25th. The path of the storm was about ten rods wide and two miles in length.

South Carolina.—Seneca, Oconee county: at 5 p. m., of the 25th, a tornado passed ten miles southeast of this place, destroying much property and causing loss of life. The storm passed within two miles of Pendleton, Anderson county, where buildings were destroyed and several persons injured.

Mr. Jackson Counts, postmaster at Peak, Lexington county, reports that one of the most destructive wind and hailstorms ever experienced in that vicinity occurred between 5 and 6 p. m. of the 25th. People and stock were injured by the falling hailstones, which were unusually large and of a variety of shapes. Several houses were unroofed, and trees and fencing were blown down.

Alston, Fairfield county: a storm passed near this place on the afternoon of the 25th, passing in an easterly direction. Dwellings, out-buildings, and trees were blown down, and at some places the storm was accompanied by hail of large size, which destroyed window-glass and injured the roofs of buildings. At Chester, Chester county, buildings were blown down.

Greenville, Greenville county: on the afternoon of the 25th a severe and destructive storm passed over Anderson and Greenville counties, destroying dwellings and causing other damage. Nearly all of the dwellings at Simpsonville, Greenville county, were blown down, and two persons were killed. During the night of the 25-26th a severe hail storm occurred, causing considerable damage to small grain.

Tennessee.—Chattanooga: on the evening of the 8th a tornado occurred at Whiteside, Marion county, where considerable damage was done. A dwelling was blown down, and one of the inmates killed. Several buildings in that vicinity were partly destroyed. A thunder-storm occurred on the afternoon of the 25th, which was accompanied by a slight fall of hail. No damage resulted in this immediate vicinity, but very destructive hail storms occurred at various points in the state.

Morristown, Hamblen county: on the afternoon of the 25th a tornado, accompanied by hail and heavy rain, visited this

county. Buildings were unroofed, trees uprooted and telegraph lines prostrated.

Nashville: this city and the northern part of Davidson county were visited by a destructive rain and hail-storm on the 25th, which caused a large amount of damage. Between 7 and 8 p. m. a tornado occurred about six miles from this city near the line of the Louisville and Nashville railroad, destroying barns and other buildings and uprooting trees.

Texas.—Fort Elliott: a severe southerly storm occurred on the 10th, the wind reaching a velocity of sixty miles per hour at 4 p.m. Telegraph lines were prostrated and at Mobeetie, a few miles southeast, a building was wrecked. On the 27th, a storm occurred during which a wind velocity of sixty-eight miles from southwest was registered.

El Paso: a severe westerly storm occurred on the 10th which caused considerable damage to roofs, signs, etc.

NAVIGATION.

In the following table are shown the danger points at the various river stations; the highest and lowest stages for March, 1884, with the dates of occurrence; and the monthly ranges:

Heights of rivers above low-water mark, March, 1884.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, Louisiana.....	29 9	1	31 11	31	18 0	13 11
<i>Arkansas:</i>						
Little Rock, Arkansas.....	33 0	1	12 0	24	7 5	4 7
Fort Smith, Arkansas.....		1	1 0	23	—1 10‡	2 10
<i>Missouri:</i>						
Yankton, Dakota †.....	20 0	22	16 0	30	15 2	2 10
Omaha, Nebraska †.....	16 0	24	15 0	20, 21	7 0	8 6
Leavenworth, Kansas.....	21 0	25	10 2	2, 3, 6, 7	5 0	10 8
<i>Mississippi:</i>						
Saint Paul, Minnesota †.....	14 6	31	9 2	24	4 0	5 2
La Crosse, Wisconsin †.....	18 0	29	9 0	27	7 0	2 0
Dubuque, Iowa †.....	21 10	26	12 9	27	11 5	1 4
Davenport, Iowa †.....	15 0	28, 29	11 11	24	9 1	2 10
Keokuk, Iowa †.....	14 0	30, 31	16 8	20	7 9	8 11
Saint Louis, Missouri.....	30 0	28	25 7	10, 11	9 5	16 2
Cairo, Illinois.....	40 0	1	49 7	11	36 2	13 5
Memphis, Tennessee.....	34 0	1, 2, 3	35 1	16, 17	31 3	3 10
Vicksburg, Mississippi.....	41 0	23	49 0	1	45 0	4 0
New Orleans, Louisiana *.....	—2 6	18, 19, 24	+ 0 1	1, 2, 4	—1 5	1 6
<i>Ohio:</i>						
Pittsburg, Pennsylvania.....	20 0	13	18 11	7	3 9	15 2
Cincinnati, Ohio.....	50 0	17	49 8	7	17 11	31 9
Louisville, Kentucky.....	24 0	14	25 10	6, 7	8 6	17 4
<i>Cumberland:</i>						
Nashville, Tennessee.....	42 0	15	49 3	4	13 9	35 6
<i>Tennessee:</i>						
Chattanooga, Tennessee.....	33 0	11	43 0	5	7 11	35 1
Knoxville, Tennessee.....		7	22 4	4	2 4	20 0
<i>Monongahela:</i>						
Pittsburg, Pennsylvania.....	29 0	13	18 11	7	3 9	15 2
<i>Savannah:</i>						
Augusta, Georgia.....	21	26 4	5	7 3	19 1	
<i>Willamette:</i>						
Portland, Oregon.....	1	7 1	21	3 5	3 8	
<i>Sacramento:</i>						
Red Bluff, California.....	10	15 0	2	2 10	12 2	
Sacramento, California.....	15	22 0	3, 4	14 0	8 6	
<i>Mobile:</i>						
Mobile, Alabama.....	18	17 4	10	14 0	3 4	
<i>Colorado:</i>						
Yuma, Arizona.....	11	27 2	27	17 0	10 2	

* Below high-water mark of 1874 and 1883. † Frozen part of month; see text. ‡ below bench-mark. § No record from 13th to 20th.

STAGE OF WATER IN RIVERS.

The upper Mississippi river at Saint Paul, Minnesota, was frozen from the 1st to 23d; at La Crosse, Wisconsin, from the 1st to 21st; at Dubuque, Iowa, from the 1st to 24th; at Davenport, Iowa, from the 1st to 23d; and at Keokuk, Iowa, from the 1st to 14th. At Saint Louis, Missouri, it was lowest on the 10th and 11th and highest on the 28th. At stations from Cairo, Illinois, to New Orleans, Louisiana, the daily stages of water are given in the table under "Floods," on page 80.

The Missouri river at Yankton, Dakota, was frozen from the 1st to 20th; and at Omaha, Nebraska, from the 1st to 18th. At Leavenworth, Kansas, it was lowest on the 2d, 3d, 6th, and 7th, and highest on the 25th.

The Ohio river was lowest on the 6th and 7th, and highest from the 13th to 17th. At Cincinnati it rose to within four